User Acceptance of Social Network Information Technology: An Empirical Analysis

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Abstract

With the rise of Facebook, Twitter, RenRen.com, Kaixin.com, and Pengyou.com et al., Social Network Service(SNS) has attracted more and more attention with the objective of social interaction and entertainment. This paper improves Heijden's model (2004), by adding the constructs such as para-social interaction and social influence, to investigate the effect of social interaction on the acceptance of SNS technology. SmartPLS has been utilized to conduct an empirical research based on 277 questionnaires collected from college students. The results indicate that social influence has a significant positive correlation with behavioral intention to be used and invited; so does structural embeddedness.

Keywords

Social Network Services; Information Technology; Technology Acceptance Model

Introduction

Facebook has developed rapidly since it was created in 2004. Now it is one of the most visited websites in the world, the Social Network Site (SNS) Facebook has an astonishing 750 million users (Koroleva et al. 2011). At the end of June 2011, Chinese social networking sites had a large scale of 230 million users[1], including Renren.com, Kaixin.com, Pengyou.com and so on.

Existing research can explain users' acceptance to IT (information system) or hedonic IT from the perspective of extrinsic motivation and intrinsic motivation (Davis 1989; Van der Heijden 2004). Although some scholars have taken the influence of social norms into consideration (Venkatesh et al. 2003), social interaction between users has not been paid enough attention in the IT adoption research. In particular, SNS as a new application of the Internet has its "social" feature, which is different from the other network services. But theories and research mentioned above all less involve in the characteristic "social" (Davis 1989; Van der Heijden 2004), therefore, it is necessary to summarize previous experience and conduct a further study on behavioral intention to use under SNS environment.

The rest of the paper is arranged as follows. In the next section, the "social" feature is highlighted on the basis of previous study, after that we develop the research model and propose hypotheses. In the third part, the research methods are introduced in details. Then the following section is about data analysis and results. The ending part is the discussion and conclusion about this study.

Theoretical Development

Base Model

TAM model mainly analyses user acceptance to productivity-oriented (or utilitarian) information system through extrinsic motivation, and it is proposed that perceived usefulness and ease of use both positively influence user acceptance. A large number of empirical results have shown its explanatory power (Davis 1989; Venkatesh et al. 2003). For hedonic IT, however, perceived enjoyment as intrinsic motivation is also positively correlated to user's IT adoption (Van der Heijden 2004). SNS has typical characteristics of hedonic information system, such as "steal food" game, "Parking War" and other games. Therefore, based on (Van der Heijden 2004), a further discussion about the influence of social on user acceptance has been available in this paper.

Although Unified Theory of Acceptance and Use of

[1] China Internet Network Information Center (2011). The 28th China Internet Development Statistics Report, http://www.cnnic.net.cn/hlwfzyj/hlwxzbg/hlwtjbg/201206/t20120612_26719.htm

Technology (UTAUT) indicate that social norms will also affect user acceptance (Venkatesh et al. 2003), the model has too many variables and that make it too complicated (Xue et al. 2011). This article is focused on social influence on user acceptance, so Van der Heijden (2004) would be taken as the base model.

Hypothesis and Research Model

"Social influence is defined as the degree to which an individual perceives that important others believe he or she should use the new system" (Venkatesh and Morris et al., 2003, p.451). IT has three kinds of forms: Subjective Norm, Social Factors, and Image. Subjective norm refers to the perceived social pressure to perform or not to perform the behavior (Ajzen 1991; Mathieson 1991; Venkatesh et al. 2003). Social factors are the individual's internalization of the reference group's subjective culture and specific interpersonal agreements that the individual has made with others, in specific social situations(Thompson et al. 1991; Venkatesh et al. 2003). Image refers to the degree to which use of an innovation is perceived to enhance one's image on status in one's social system (Moore et al. 1991; Venkatesh et al. 2003). The three forms described above indicate that social influence has a significant effect on human behavior.

Social networking sites are designed to foster social interaction in a virtual environment(Bolden et al. 2009), and its popularity lies in providing the opportunity for users to share their daily experiences, memorable moments, thoughts, feelings and opinions with each other (Koroleva et al. 2011). Because of these functions, SNS has become an entirely new method of self-presentation (Mehdizadeh 2010).

There are three different processes of social influence: compliance, internalization and identification (Cheung et al. 2011). Compliances is that people are asked to perform a specific behavior, and they will be rewarded or punished according to behave or not (Venkatesh et al. 2000). Internalization refers to the adoption of common self-guides to achieve idealized goals shared with others (Dholakia et al. 2004). Identification occurs when an individual accepts influence because he/she wants to establish or maintain a satisfactory self-defining relationship with another person or a group (Kelman 1958). It seems that there is no relationship between compliance and user's SNS adoption, but SNS is an application to expand social interaction, and the two processes international and identification of social influence will make users easier to accept SNS because it enhances interaction with friends and maintain good relationships.

Hypothesis 1 (H1): Social Influence is Positively Related to User Acceptance of SNS.

Para-Social Interaction (PSI) refers to that the audiences regard mass communication especially roles in television as real persons, and makes a series of cognitive and emotional response, and it is a kind of interactive phenomenon that media figures or media celebrity replace communication in reality (Horton et al. 1956). Seen from the outside, it is due to the rapid development of information technology that leads to the phenomenon, and new media provide more ways for audiences to know media figures they concerned. But examining the phenomenon from a deeper level, it is derived from the human instinct of attaching others and has nothing to do with the distance (Rubin et al. 1987). Disseminated by different media, the talent and charm of the media figures can be exaggerated and amplified, so they will produce different degrees of influence to the audience. Studies discover that the audience's evaluation on information sources credibility is positively related to para-social interaction, with the growth of trust the degree of para-social interaction will also be deeper (Perse 1990; Rubin et al. 1985; Rubin et al. 1987). On the other hand, as the deepening of the para-social interaction, the audience's trust to media will also increase, then the audience will be easier to accept media figures' views (Basil 1996).

In terms of the motivation of para-social interaction, there are two explanations that conflict with each other—deficiency paradigm and global-use paradigm. Deficiency paradigm holds the view that para-social interaction can replace face to face interpersonal communication, catering to those who are lack of it for the reason of environment or psychology (Horton et al. 1956; Perse 1990; Rubin et al. 1985). Global-use paradigm is regarded as normal experience that everybody can participate in, and it is the complement of face to face interpersonal communication whether they are satisfied with the actual interpersonal communication or not (Nordlund 1978).

For lone wolf who lack interpersonal attachments in real life, para-social interaction can make up for it, and this is the reflection of deficiency paradigm. In the modern fast-speed city life, people have to bear the pressure from life, work and study and have a feeling of lacking the sense of belonging. Through para-social interaction, people can relieve mental pressure, increase

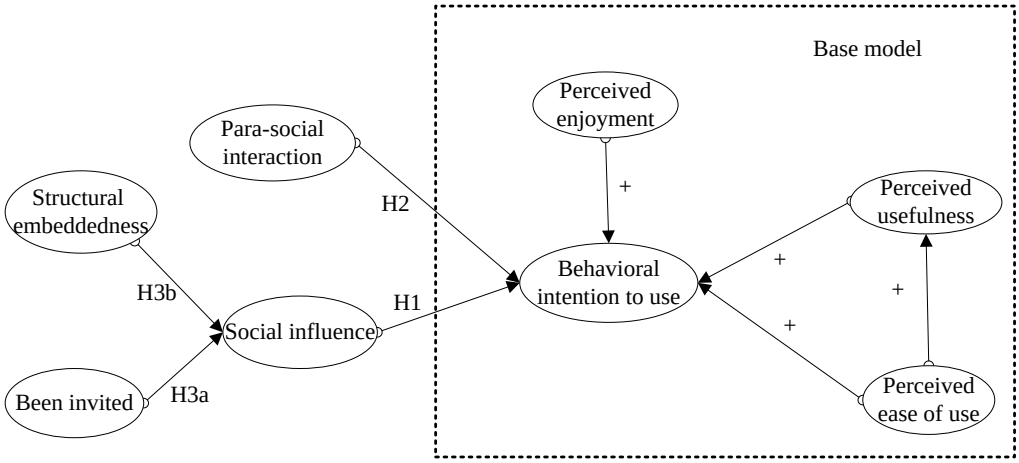

FIG. 1 RESEARCH MODEL

entertainment in life, and even seek the sense of belonging. The need to be belonging is a fundamental motivation for other countless interactive behaviors (Baumeister et al. 1995), and this is the reflection of global-use paradigm.

In the early 2009, some media celebrity joined in the Kaixin.com and RenRen.com successively, including singers, hosts, models, sports stars, actors and so on. The SNS users can become friends or fans with these media celebrity and establish relationship like common friends through the way of message, sharing, sending gifts, participating in games and so on. In the recently research, para-social relationship has been mainly regarded as an acceptable relationship, which is a close relationship from long distance and a virtual friendship to build a special interpersonal relationships with media celebrity (Cohen 2004).

From the analyses above, it can be proved that both the audiences' trust to the media celebrity and the sense of belonging can make contribution to the development of para-social interaction, and SNS just provides a good platform. By using SNS, media celebrity can interact with fans to achieve the double purposes of exposure and improving their popularity. The audiences will also register and use SNS just because the media celebrities they like.

Hypothesis 2 (H2): Para-Social Interaction is Positively Related to User Acceptance of SNS.

Being invited means someone is invited to join the SNS by the users who have already used SNS. Social influence can be that users's perception that most people who are important to him think he should perform the behavior in question, as well as that an individual is invited to join SNS without perceiving if the system is useful or easy to use. So it is necessary to consider the determinants of social influence.

Hypothesis 3a (H3a): Been Invited Has Direct Positive Impact on Social Influence.

Structural embeddedness refers to the effect made by social network on users. The social network built by the behaviors is embedded in the social structure they constitute and is determined by the culture and value factors from the structure (Granovetter et al. 1992). Structural embeddedness is an important concept in social network theory, especially for the application of SNS, taking Internet as a medium to build social network. According to the point of structural embeddedness, if users subjectively think that they can communicate and keep good relationships with a large proportion of their friends, classmates and colleagues et al., then they will more inclined to use SNS to maintain their social interaction (Guopeng et al. 2011), so the way of users' social influence will be changed.

Hypothesis 3b (H3b): Structural Embeddedness Has Direct Positive Impact on Social Influence.

In conclusion, from the analysis above we can get the research model of this paper, as shown in FIG. 1.

Measurement Development and Data Analysis

According to SNS users' behavior research report published by Dataa Consulting[2], the people whose age between 21 and 25 are the major users of SNS at present, accounting for 42.7% of the total users, and age from 16 to 20 accounts for 30.6%. As a whole, SNS users under the age of 30 accounts for more than 90%.

[2] A market research firm, http://wenku.baidu.com/view/14b452ea551810a6f52486bf

According to the latest data released by CNNIC, the highest proportion of Internet users is students, accounting for 29.9%. From the two points mentioned above, it can be inferred that a majority of SNS users are college students, therefore, college students' behavior and attitudes toward SNS have a strong representative for the whole SNS group. For this reason, this study has no limitation on the types of users, with the objects of both college students who have used SNS actually and students who have not.

TABLE 1 SOURCE OF MEASUREMENTS

Constructs	Items	The Source of reference
.Para-social interaction	8	Cohen, (2004)
.Perceived usefulness	4	Davis,(1989); Venkatesh and Morris et al., (2003)
Perceived enjoyment	6	Van, (2004)
Structural embeddedness	4	Granovetter and Swedberg, (1992)
Been invited	3	Invented by this study
Social influence	2	Venkatesh and Morris et al., (2003)
Perceived ease of use	3	Davis,(1989); Venkatesh and Morris et al., (2003)
Behavioral intention to use	3	Fishbein and Ajzen (1975)

Eight constructs were measured in this study. Their items's main reference source specifically are shown in TABLE 1. The questionnaires mainly use five-point Likert semantic differential scale, and options of the questionnaire range from "totally agree" to "totally disagree". Perceived usefulness, perceived ease of use and social influence all have direct effect on behavioral intention, in accord with variable relationship proposed by TAM and UTAUT. Para-social interaction and perceived enjoyment both have direct impact on behavioral intention put forward in this paper, so do the external variables of social influence.

A total of 300 questionnaires has been distributed, of which 277 were completed and returned, resulting in a 92.33% response rate. In our paper, Cronbach's alpha was used to evaluate the reliability of the measurements. The Cronbach's alpha greater than or equal to 0.7 is the critical value that the observed variables' internal consistency reliability can be accepted. The model is considered acceptable if all AVEs are above 0.5.

Cronbach's alpha of all the principal constructs are above 0.7 through the analysis of relevant data, and the composite reliability scores reach 0.915, so it can be concluded that the scale is of high reliability. Except for perceived enjoyment, the AVEs of other constructs are above 0.5, and the square root of AVE of each construct is much greater than all cross-correlations between the construct and other constructs. In conclusion, all these tests mentioned above suggest adequate convergent and discriminant validity of the measurements, just as shown in TABLE 2.

Partial least squares (PLS) has been utilized to validate the measurements and test the hypotheses. The reasons can be listed as follows. First of all, PLS has no high demand for sample size and residual distribution, therefore it can be used for small sample. Secondly, when used for testing complex structural model, it avoids inadmissible solutions and factor indeterminacy. Finally, both reflective and formative constructs can be estimated by PLS. Hence, this method is selected instead of structural equation modeling (SEM) (Xue et al. 2011).

Conclusion and Discussion

Conclusion

The base model has been tested. FIG. 2 shows the PLS results of base model testing. Except for the relationship between Perceived Ease of Use and behavioral intention to use, other relationships are proved to be significant. Specifically, behavioral intention to use is predicted by both perceived enjoyment and perceived usefulness; and perceived usefulness is predicted by perceived ease of use. Overall, the base model explains 30% of the variance in behavioral intention to use.

TABLE 2 LATENT VARIABLES CORRELATIONS, AVE AND DISCRIMINANT VALIDITY

Constructs	Cronbach's alpha	Composite reliability	1	2	3	4	5	6	7	8
1. intention to use	0.89	0.93	**0.91**							
2.Para-social interaction	0.92	0.94	0.20	**0.80**						
3.Been invited	0.77	0.84	0.33	0.49	**0.79**					
4.Perceived enjoyment	0.74	0.85	0.33	0.44	0.48	**0.68**				
5.Structural embeddedness	0.82	0.90	0.48	0.20	0.28	0.37	**0.80**			
6.Perceived ease of use	0.79	0.88	0.36	0.03	0.21	0.25	0.46	**0.84**		
7.Social influence	0.73	0.85	0.34	0.47	0.36	0.39	0.35	0.09	**0.73**	
8.Perceived usefulness	0.82	0.90	0.34	0.06	0.15	0.27	0.43	0.46	0.19	**0.73**

Notes: The diagonal elements (in bold) are square roots of AVE.

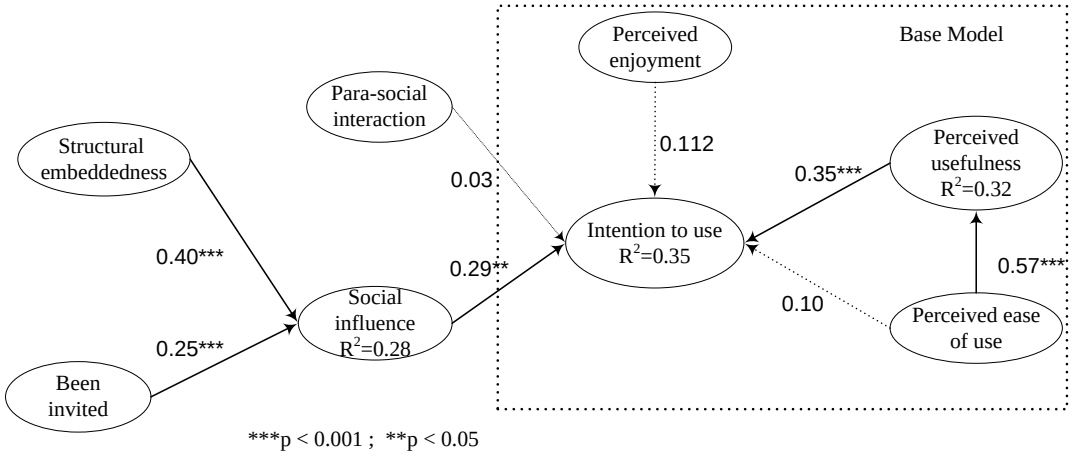

FIG. 3 PLS RESULTS OF FULL MODEL TESTING

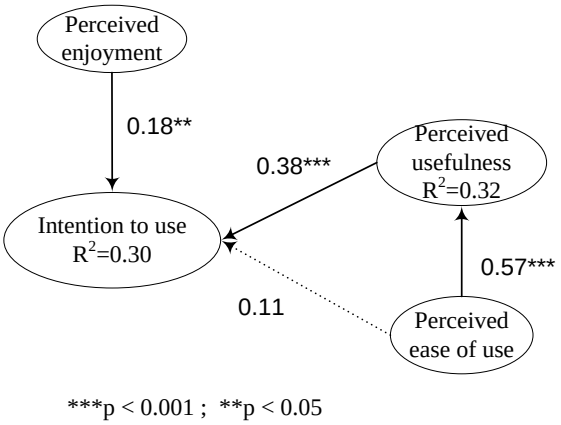

FIG. 2 PLS RESULTS OF BASE MODEL TESTING

FIG. 3 shows the evaluation results of the full research model. The full model explains 35% of the variance in behavioral intention to use, 5% more than that explained by the base model. Specifically, para-social interaction and perceived ease of use both have insignificant paths to behavioral intention to use, failing to support H2. In contrast, the path from social influence to behavioral intention to use is significant, which supports H1. Hypotheses H3a and H3b are supported because the paths from "Been invited" and "structural embeddedness" to "social influence" have significant coefficients. The model testing shows that both being invited and structural embeddedness have indirect effects on behavioral intention to use through social influence. It should be paid attention that in the full model, perceived enjoyment doesn't show a significant effect on behavioral intention.

Perceived usefulness has a direct positive effect on behavioral intention to use and perceived ease of use has a significant effect on perceived usefulness, which is in accord with the technology acceptance model (TAM), indicating that the TAM model still has a good adaptability in the SNS environment. However, the testing result of the full model shows that perceived enjoyment does not influence behavioral intention to use. The possible explanations are listed as follow.

In China, the most fundamental reason may be that people are so crazy about SNS, spending more time on "Stealing food", Parking War and other social games, which are not very conform to the original intention of creating SNS to establish social relationships online. Analysis International[3] analysed that the use of game applications to attract users is appreciate in the early development process for the manufacturer to attract a large number of users in a short time, which is in accordance with the objective law in the early development of SNS market in China. However, with the maturing of SNS industry in China, users and manufacturers begin to consider problems in a rational way. Social game is just a part of social life, not the whole or the most important part, hence it is can be understood that perceived enjoyment has no effect on SNS behavioral intention to use.

Result in this paper demonstrates that perceived ease of use has no significant effect on behavioral intention to use through their standardized path coefficients. It seems that the conclusion is contrary to common sense. The possible explanation is that the SNS has been developed for more than 8 years, even users who never use it will also know something about, and users with different levels of computer skills can use it easily. In addition, perceived ease of use in this study is different from the definition in traditional technology acceptance studies, and the measurements are developed from the perspective of improving the social interaction. However, measurements in this part of previous literature are mostly self-developed. So

[3] A provider of information product, service and solution in China internet market.

compared to mature questionnaires, the measuring effect will be weaker, which can also lead to the mismatch between the final result and classic conclusion.

That social influence has a great effect on behavioral intention to use is proved to be right, indicating that in the Internet environment, because of the rapid transmission and the explosive growth of information the updating speed of Internet products become faster, and we can hardly avoid the influence of friends around us who try new things. At the same time, SNS itself is established to help users expand their social circle, forming the feature of word-of-mouth marketing. The relative importance of social influence also reflects the Internet feature and social contact characteristic of SNS.

That Para-social interaction is positively related to user acceptance of SNS is proved to be wrong. The possible reason may be that in the early 2009, some media celebrity began to join SNS successively, while the majority of respondents joined the social networking sites before 2009, so the reason they accept SNS certainly do not include para-social interaction.

Implications

There are some deficiencies in this research. First of all, in this paper the questionnaires are distributed to college students. Although we have analyzed relevant data to prove that it is reasonable to choose college students as respondents, there are white-collar workers, teachers and other SNS users and the users gradually penetrate to younger students who are in high schools and middle age group according to some reports. It is difficult to collect questionnaires, especially outside school. Hence, our questionnaires were all distributed in campus. For the limitation of time and energy, the sample size is not big enough and the narrow source of sample can easily lead to specialization of the model. For another, the scope of SNS is narrow down by us, for the social network sites in this paper are mainly for making friends and entertainment, excluding SNS for business and marriage. So the conclusion we get maybe not suitable for all kinds of SNS in some extent.

ACKNOWLEDGMENT

This research was supported by the National Natural Science Foundation of China under Grant 71171062, Philosophy and Social Science of Guangdong under Grant GD12CGL12, and Doctor's Funding of Guangdong University of Technology 12ZS0121.

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